Claims

[c1] Claim 1.A method of optimizing the power consumption of a trip unit, comprising:
sensing a first output from a power system, said first output including a first current and a current-sensing signal, said current-sensing signal being indicative of current in said power system;
supplying a power supply with only said first current, or with a second current alone or in combination with said first current;
powering a microprocessor from said power supply;
inputting a second output to said microprocessor indicative of whether said power supply is receiving said second current;
operating said microprocessor at a first state when said second output indicates said power supply is not receiving said second current; and
operating said microprocessor at a second state when said second output indicates said power supply is receiving said second current.

[c2] Claim 2.The method as in claim 1, wherein operating said microprocessor at said first state comprises:
comparing said current-sensing signal to a set of predetermined protection parameters in said microprocessor; and
actuating separable contacts connected to said power system if said current-sensing signal meets one or more of said set of predetermined protection parameters.

[c3] Claim 3.The method as in claim 2, wherein said set of predetermined protection parameters is selected from the group consisting of instantaneous over current protection, long time protection, short time protection, and ground fault protection.

[c4] Claim 4.The method as in claim 1, wherein operating said microprocessor at said second state comprises:
performing a set of functional features selected from the group consisting of waveform capture, metering, voltage protection algorithms, current protection algorithms, and communication functions.

[c5] Claim 5.The method as in claim 4, further comprising:
sensing a voltage-sensing signal from said power system, said voltage-sensing signal being indicative of voltage in said power system;
comparing said voltage-sensing signal to a set of predetermined voltage protection parameters in said microprocessor; and
actuating separable contacts connected to said power system if said voltage-sensing signal meets one ore more of said set of predetermined voltage protection parameters.

[c6] Claim 6.The method claim 1, further comprising:
operating said microprocessor at a first clock speed in said first state; and
operating said microprocessor at a second clock speed in said second state, said second clock speed being faster than said first clock speed.

[c7] Claim 7.The method as in claim 1, further comprising:
reducing an operating voltage of said microprocessor in said first state; and
increasing said operating voltage of said microprocessor in said second state.

[c8] Claim 8.The method as in claim 1, further comprising:
turning off operating current to at least some peripherals operatively connected to said microprocessor in said first state; and
turning on operating current to said at least some peripherals in said second state.

[c9] Claim 9.A trip unit, comprising:
a microprocessor operable at either a first state or a second state, said second state requiring more power than said first state;
an analog-to-digital converter operatively connected to said microprocessor, said analog-to-digital converter being configured to receive a current-sensing signal, and being configured to provide said current-sensing signal to said microprocessor; and
a power supply being configured to receive a first current, or a second current alone or in combination with said first current, said power supply providing an output to said microprocessor indicative of whether said power supply is receiving said second current, said power supply providing an operating current

to said microprocessor and said analog-to-digital converter; and
said microprocessor being configured to adjust between said first and second states depending upon said output.

[c10] Claim 10.The trip unit as in claim 9, wherein said microprocessor is configured to operate in said first state when said output indicates said power supply is receiving only said first current and being configured to operate in said second state when said output indicates said power supply is receiving said second current or a combination of said first and second currents.

[c11] Claim 11.The trip unit as in claim 10, wherein said microprocessor adjusts between said first and second states by adjusting one or more of a clock speed of said microprocessor, an operating voltage of said microprocessor, and an operating current to one or more peripherals of said microprocessor.

[c12] Claim 12.The trip unit as in claim 11, wherein said microprocessor is configured to provide only a set of basic protection features in said first state, and is configured
to provide said set of basic protection features and a set of functional features in said second state.

[c13] Claim 13.The trip unit as in claim 12, wherein said set of basic protection features is selected from the group consisting of instantaneous over current protection, long time protection, short time protection, and ground fault protection.

[c14] Claim 14.The trip unit as in claim 12, wherein said analog-to-digital converter is configured to receive a voltage-sensing signal, and is configured to provide said voltage-sensing signal to said microprocessor.

[c15] Claim 15.The trip unit as in claim 14, wherein said set of functional features are selected from the group consisting of waveform capture, metering, voltage protection algorithms, current protection algorithms, and communication functions.

[c16] Claim 16.A circuit breaker, comprising:

a trip unit including a microprocessor and a power supply;
a current sensor operatively connecting said trip unit to a power system, said current sensor providing a current-sensing signal to said microprocessor and a first current to said power supply; and
an output from said power supply to said microprocessor, said output being indicative of whether said power supply is receiving said first current, or a second current from an auxiliary power source alone or in addition to said first current, wherein said microprocessor operates at a first state when said power supply receives only said first current, but operates at a second state when said power supply receives said second current alone or in addition to said first current.

[c17] Claim 17.The circuit breaker as in claim 16, further comprising:
an actuator operatively connecting said microprocessor to a plurality of separable contacts of said power system.

[c18] Claim 18.The circuit breaker as in claim 16, wherein said microprocessor is configured to provide only a set of basic protection features in said first state, but to provide said set of basic protection features and a set of functional features in said second state.

[c19] Claim 19.The circuit breaker as in claim 18, wherein said set of basic protection features is selected from the group consisting of instantaneous over current protection, long time protection, short time protection, and ground fault protection.

[c20] Claim 20.The circuit breaker as in claim 18, further comprising:
a voltage sensor operatively connecting said trip unit to said power system, said voltage sensor providing a voltage-sensing signal to said microprocessor.

[c21] Claim 21.The circuit breaker as in claim 20, wherein said set of functional features are selected from the group consisting of waveform capture, metering, voltage protection algorithms, current protection algorithms, and communication functions.

[c22] Claim 22.The circuit breaker as in claim 16, wherein said microprocessor

adjusts between said first and second states by adjusting one or more of a clock speed of said microprocessor, an operating voltage of said microprocessor, an operating current to one or more peripherals of said microprocessor.

[c23] Claim 23.A control algorithm for a trip unit, comprising:
a first decision node configured to determine whether to operate a microcontroller in a first state if no auxiliary current is provided to a power supply of said trip unit and to operate said microcontroller in a second state if said auxiliary current is provided to said power supply, said first state consumes a first level of power by executing only a set of basic protection features and said second state consumes a second level of power by executing said set of basic protection features and a set of functional features, wherein second level of power is higher than said first level of power.